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is, however, entirely unaccompanied by information regarding subsequent publication, there being no preface, outline, introduction, or explanatory note. But every part of this index is of greatest service to those who have occasion to consult the work, and we are grateful to have the use of the first part while the second is in preparation.—J. C. A.

An introduction to horticulture.

The arrangement into a clear and well-defined science of the principles which underlie an old and empirically developed art is a matter of slow growth. Horticulture boasts of being the oldest of human arts, and yet the science of horticulture is ill defined and without adequate representation in logical form. Especially since the establishment of colleges for the teaching of agriculture and allied subjects a concise text-book to serve as a basis for horticultural teaching has been a genuine desideratum.

A work that appears in many ways to possess the right qualities for meeting in part these demands has recently been put forth by Professor Emmet S. Goff³ of the University of Wisconsin. The work is the outgrowth of the author's long experience in teaching horticulture, supplemented by especially successful labors as an experimental horticulturist.

In contrast with the usual method of writing a general treatise and subsequently condensing an introductory work from it, the author has first prepared the elementary text. The work is designed for students in first-year college work, having little or no previous instruction in chemistry, physics, or botany. The work opens with a dozen pages of fundamental matters, clearly and succinctly stated. The remainder of the work is divided into four parts: *a*, the round of plant life from germination to the production of seed, with many details of structure and physiological action; *b*, the plant as affected by unfavorable environment, such as extremes of temperature, light, water, food, etc., embracing a variety of ecological observations of great interest to the cultivator; *c*, plant manipulation, especially propagation by seeds and division, transplanting and pruning; and *d*, plant breeding. In an appendix is given an outline for a course of sixty or more laboratory experiments to practically illustrate the text.

The work is written in a lucid and crisp style, well paragraphed for class use, and throughout imparts the feeling of a strictly scientific treatment, always apropos, however, of work-a-day application.

There is little in the book that invites adverse criticism. The only matter worth mentioning is the use of the term assimilation. It is made to cover the formation of plant food by chlorophyll bodies, a time-honored usage, but

³ GOFF, E. S.—Principles of plant culture: an elementary treatise designed as a text-book for beginners in agriculture and horticulture. Madison, 1897. Published by the author. 12mo, pp. 276. 173 illustrations.

wholly erroneous and indefensible. Curiously enough, the same sentence which defines the author's use of the term includes a statement of assimilation in the really proper sense: use of the food "by the protoplasm in making new parts and in repairing waste." One cannot but wonder how long a time must elapse before the three independent processes in plants—the chlorophyllous production of food, digestion, and assimilation—will be generally apprehended to an extent that will insure their correct presentation in works that purport to be botanically accurate.

To offset the misuse just referred to, although making it the more inexplicable, one can heartily commend the careful employment of the terms fecundation and pollination, in place of the much-abused term, fertilization, which is often made to do service for both processes without distinction. In general the book is to be praised on account of the careful balance preserved between the various divisions of the subject, for the logical method of presentation throughout, and for the serviceable illustrations, two-thirds of which are original.

Some regret must be felt that the work has been arranged for such an elementary grade of instruction. Yet having performed the more difficult task of writing an acceptable work for beginners, it is to be hoped that the author will follow it with a general treatise suitable for more advanced students.—J. C. A.

Plant diseases.

Another general work is now available to the student of plant diseases. An English edition of Dr. von Tubeuf's book, issued in Germany in 1895, which treats of those diseases of plants induced by cryptogamic parasites, has been prepared by his former pupil, Dr. Wm. G. Smith⁴ of Edinburgh. The English edition is printed on extra thick paper, which makes the work uncomfortably heavy, considering the amount of matter it contains, but has the one merit of displaying to good advantage the numerous half tone engravings from the author's excellent photographs. The work is well printed. The translation is in general acceptable, although one must take exception to the indefensible and unscientific use of the word "fungoid" for fungus, an error that can only be forgiven in unlearned writers.

One hundred pages of the work are given over to the nature and effects of parasitism, with some account of the extent of parasitic diseases and means for combating them. The remaining five-sixths of the work are devoted to a systematic account of the fungi, bacteria, myxomycetes, and algæ that cause

⁴TUBEUF, DR. KARL FREIHERR VON.—Diseases of plants induced by cryptogamic parasites: introduction to the study of pathogenic fungi, slime-fungi, bacteria and algæ. English edition by William G. Smith. Longmans, Green & Co., London, New York and Bombay, 1897. 8vo. pp. 598. 330 illustrations. \$5.50.